

REMARKS

Drawings

The Examiner has objected to Figures 1A-1E for failing to include the designated legend, such as --Prior Art-- because only that which is old is illustrated.

Applicant submits herewith proposed drawings corrections in red to Figures 1A-1E to overcome the Examiner's objections. Applicant wishes to differ submission of Formal Drawings until a Notice of Allowance for the above referenced case is received.

Status of claims

Examiner states that claims 30-43 are pending, claims 38-43 are withdrawn and claims 30-37 are rejected.

Claim Objections

Claim 34 is objected to because of the following informalities: line 2, "the germanium" should be the --the silicon germanium--. Applicant has amended claim 34 to more particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim Rejections - 35 U.S.C. § 112, first paragraph

The Examiner has rejected claim 34, 36 and 37 as containing subject matter which is not described in the specification in such a way as to enable one skilled in the art to which it pertains or to which it must nearly connected to make

and/or use the invention. Applicant has amended claims 34, 36 and 37 to more particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim Rejections – 35 U.S.C. § 102

The Examiner has rejected claims 33-35 are rejected under 35 U.S.C. § 102(e) as being anticipated by Chau et al. (US Patent 6,165,826). It is Applicant's understanding that amended claims 33-35 are not taught by Chau et al. It is to be appreciated that amended claims 33-35 now depend upon independent claim 30. Independent claim 30 claims, among other limitations, a pair of sidewall spacers on opposite sides of the gate electrode, the sidewall spacers having a first height above the substrate surface, the first height greater than the sum of the first second and third thicknesses. Applicant does not understand Chau et al. in Figure 3H to describe sidewall spacers 330 which extend above the combination of gate electrode 308, semiconductor film 322 and silicide 342. As such, claims 33-35 are not anticipated by Chau et al. Applicant therefore respectfully requests the removal of the 35 U.S.C. § 102(e) rejections of claims 33-35.

Claim Rejections – 35 U.S.C. § 103

The Examiner has rejected claims 30-32 and 36-37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Moslehi (US Patent 5,168,072) in view of Kawaguchi (US Patent 5,739,573 of record).

It is Applicant's understanding that cited references fail to teach or render obvious Applicant's invention as claimed in claims 30-32 and 36-37. In claims 30-32 and 36-37, Applicant teaches and claims a method of forming a semiconductor device comprises "a pair of source and drain regions formed on opposite sides of said gate electrode, said source and drain regions having a silicon germanium film formed beneath the substrate surface". It is Applicant's understanding that neither Moslehi nor Kawaguchi teach or render obvious formation of a silicon germanium film beneath the surface of the substrate upon which the gate dielectric layer is formed. Moslehi, in Figure 19, shows the formation of silicon germanium films 87 and 92 onto or above the substrate surface upon which the gate dielectric layer 51 is formed. Kawaguchi fails to show the formation of a silicon germanium film at all. Accordingly, the combination of Kawaguchi and Moslehi fails to teach or render obvious Applicant's invention as claimed in claims 30-32 and 36-37. As such, Applicant respectfully requests the removal of the 35 U.S.C. § 103 rejections of claims 30-32 and 36-37 and seeks an early allowance of these claims.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

30. (Amended) A semiconductor device comprising:
a gate electrode formed on a gate dielectric formed on a substrate surface, the gate electrode having a first thickness;
a gate silicon germanium film formed on the gate electrode, the gate silicon germanium film having a second thickness;
a gate silicide layer formed on the gate silicon germanium film, the silicide layer having a third thickness;
a pair of sidewall spacers on opposite sides of the gate electrode, the sidewall spacers having a first height above the substrate surface, the first height greater than the sum of the first and second and third thicknesses[.];
a pair of source and drain regions formed on opposite sides of said gate electrode, said source and drain regions having a silicon germanium film formed beneath said substrate surface.

32. Cancelled

33. (Amended) [A] The semiconductor device of claim 30 further comprising:
[a pair of source/drain regions formed on opposite sides of a silicon gate electrode;
a silicon germanium film formed on the source/drain regions; and]
a silicide layer formed on the silicon germanium film of said source and drain regions.

34. (Amended) The semiconductor device of claim 33 further comprising:

an isolation region having a top surface positioned below the top surface of the silicon germanium film of said source and drain regions.

36. (Amended) A semiconductor device comprising:

a silicon gate electrode formed on a gate dielectric formed on a substrate surface, the silicon gate electrode having a first thickness;

a gate silicon germanium film formed on the silicon gate electrode, the gate silicon germanium film having a second thickness;

a gate silicide layer formed on the gate silicon germanium film, the gate silicide layer having a third thickness[, the third thickness greater than the first thickness];

a pair of sidewall spacers on opposite sides of the silicon gate electrode, the sidewall spacers having a first height above the substrate surface, the first height greater than the sum of the first and second and third thicknesses;

a pair of source/drain regions formed on opposite sides of the silicon gate electrode;

a source/drain silicon germanium film formed on the source/drain regions wherein said silicon germanium film is formed below said substrate surface; and

a source/drain silicide layer formed on the source/drain silicon germanium film.

38. Cancelled.

39. Cancelled.

40. Cancelled.

41. Cancelled.

42. Cancelled.

43. Cancelled